

Article

Transforming Saltbush: Science, Mobility, and Metaphor in the Remaking of Intercolonial Worlds

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Abstract

The movement of exotic biota into native ecosystems are central to debates about the acclimatisation of plants in the settler colonies of the nineteenth century. For example, plants like lucerne from Europe and sudan grass from South Africa were transferred to Australia to support pastoral economies. The saltbush *Atriplex* spp. is an anomaly—it too, eventually, became the subject of acclimatisation within its native Australia because it was also deemed useful to the pastoralists of arid and semi-arid New South Wales. When settlers first came to this part of Australia, however, initial perceptions were that the plants were useless. We trace this transformation from the desert ‘desperation’ plant during early settlement to the ‘precious’ conservation species, from the 1880s, when there were changes in both management strategies and cultural responses to saltbush in Australia. This reconsideration can be seen in scientific assessments and experiments, in the way that it was commoditised by seeds and nursery traders, and in its use as a metaphor in bush poetry to connote a gendered nationalist figure in Saltbush Bill. We argue that while initial settlers were often so optimistic about European management techniques, they had nothing but contempt for indigenous plants. The later impulses to the conservation of natives arose from experiences of bitter failure and despair over attempts to impose European methods, which in turn forced this re-evaluation of Australian species.

Keywords: saltbush, *Atriplex*, acclimatisation, fodder plants, drought, pastoralism, New South Wales, Australia

INTRODUCTION

In the twenty-first century, the saltbush *Atriplex* spp., the drought hardy and salt tolerant native shrubs of Australia, are listed as endangered species in New South Wales. The sources of conservation strategies for these native plants date back to the nineteenth century when a relationship formed between pastoralist needs, acclimatisation, and entrepreneurial exploitation. The adverse impacts of European settlement are often characterised as resulting from an overwhelming confidence in European methods and technologies. This corresponded with a disinterest in

recognising the value of species and biological systems that were unfamiliar to them. Botanically, the western plains of New South Wales were sparse, populated by mulga *Acacia aneura*, gidgee *Acacia cambagei*, Chenopods *Rhagodia*, *Sclerolaena*, and saltbush *Atriplex* spp. (Figure 1). Rather than the favourably regarded grasses of what European settlers’ called the ‘parkland’ of the eastern plains of New South Wales, these arid and semi-arid areas were seen as a relatively unproductive wasteland.

Squatters and pastoralists so completely linked saltbush with wasteland that it was quite impossible for them to value the blue-green shrubs. For the early land owners, it was a nuisance to be replaced with more familiar fodder plants, which they presumed were more nutritious to livestock. Despite such negative views of saltbush, domestic animals consumed it and found it palatable. By the late nineteenth century, these views had changed. Through the cumulative effect of environmental degradation through overstocking, the rabbit plague, and a misunderstanding of the drought cycles, settlers were forced to reappraise the plants that could survive these tough conditions. This reassessment, we argue, arose not from

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settler confidence of European superiority in land management but on the contrary, from the recognition of European land management failure. The conservation of saltbush emerges from this recognition.

By the late nineteenth century, conservation was deployed by Europeans to protect plants and ensure their future availability for economic reasons. These ideas of conservation contrast with the twenty-first century definitions that value plants, animals, and their habitats in their own right, outside of human uses and needs. Conservation in the nineteenth century was instead focussed on the preservation and cultivation of species to retain their viability as resources for use by humans. It was an interconnected network of urban and rural scientists and experimenters that assessed and then promoted the conservation of the plant because of its value to pastoralists as a drought-tolerant species. This transformation was partially effected because this group sent the plants into the intercolonial networks of botanical exchange that linked up Australia and Australian settlement problems with comparable arid regions in India, South Africa, and America. It was this movement of plants and a growing international understanding of the plants' value that enhanced the transformation of the saltbush as worthy of conservation in Australia. One of the outcomes of this circulation was the uptake of saltbush seeds in the agricultural seed and nursery industry, making them a commodity in the settler economy of Australia, South Africa, and elsewhere.

Lest we assume that this is purely a scientific and economic story, the saltbush transformation is also evident in Australian colonial literature adding another layer to this history. Banjo Paterson's figurative use of the plant in his character Saltbush Bill demonstrates the concurrent circulation of saltbush as a metaphor. Alongside scientific and economic uses for the plant, its emergence as a metaphor in the colonial literature demonstrates the multiple ways it entered settler discourses. It was the process of coming to terms with social, political, and environmental failure as well as with the uses of particular pastures which can be traced in the revaluation of saltbush from desert 'desperation' fodder to precious 'conservation' species, from the mid 1880s. Revaluing saltbush—and indeed restoring it to prevalence—seemed to be a way to turn settler failures around to become part of a new story of hope about successfully settling the continent.

LOCATING SALTBUSH

Saltbush are present in all of the states of Australia except Tasmania but they are prominent in the western area of New South Wales where the winter rainfall is between 150 and 500 mm of rain per annum (Figure 2). They thrive in grassland communities and live as understory plants with Belah *Casuarina cristata*, Rosewood *Dysoxylum fraseri*, and Myall trees *Acacia* sp. Old man saltbush *Atriplex nummularia* and bladder saltbush *Atriplex vesicaria* were



Figure 1
The western division of New South Wales

the dominant species in the southern riverine plains of New South Wales. Saltbush have multi-tiered root systems that include shallow, deep, and lateral roots that maximise their water uptake in different parts of the drought-flood cycles (Ledger and Morgan 2007: 34). Agronomists A.C. Grice and S.J. Muir (Grice and Muir 1988) point out that they are “distinguished by layers of vesicles or bladder cells on the leaf surface”. This feature means that they can survive for longer periods with sporadic water supply. They survive in soils with high salt levels, storing salt in their leaves, hence the vernacular name saltbush. They grow in a range of places from the cracking clays to the desert loams and calcareous soils, all found across western New South Wales.

Today *Atriplex infrequens* and *Atriplex sturtii* are both on the threatened species register under the New South Wales Threatened Species Conservation Act 1995. In the USA, *Atriplex* sp. appears on the inventory of Invasive Plants of California’s Wildland and is also considered a problem in the western states of Arizona, New Mexico, Nevada and Utah (California Invasive Plant Council Undated), in contrast to Australia where it is an endangered species. Old man saltbush

Atriplex nummularia is a declared category 2 invasive plant under the South African Conservation of Agricultural Resources Act 1983 (Agricultural Research Council South Africa Undated). In India, however, there are native plants called ‘saltbush’ and the Australian ones do not appear on any invasive plant lists, and thus generates a number of questions about the way it adapted to historical specificity of different regional environments. Certainly as late as 1995, Indian botanist Pramila Rajput (1995) was advocating for the introduction of Australian varieties into the desert ecologies of Rajasthan. Each of these places were subject to the introduction and cultivation of saltbush, saltbush material, and saltbush information in the nineteenth century with varied but continuing ramifications.

There is a spatial dimension to the transfer of saltbush. The movement of saltbush remade environments in local and regional places while connecting people, knowledge, and plants at intercolonial and therefore global scales. Key imperial centres such as botanic gardens were involved in these transfers through the creation of the governmental infrastructure of science (see Brockway 1979; Grove 1995; Drayton 2003). Science was located at all of these scales where saltbush was transformed into a plant subject to the practices and geographies of science (Livingstone 2010). It was collected and then identified in the laboratories of Sydney and Melbourne. Saltbush was written up in reports and journals read by scientists in Australia, South Africa, and India. It was the subject of experiments in remote locations of Coolabah in New South Wales in Australia and Tulare in California in the USA. The location of saltbush science is central to demonstrating both its movement and the way it emerged in intercolonial worlds.

A straightforward focus on the spaces of science, however, is too narrow to encompass the broader cultural and economic networks that were complicit in moving saltbush. Incorporating Australian bush poetry or commercial applications for saltbush would be impossible in such an analysis. Saltbush moved within a whole range of interconnected discourses of which science and its spaces are only one set. Critically, the materialities of the arid environments of New South Wales are also key actors in this story. As Chris Otter (2011) argues, external environments are not simply backgrounds on which social events play out. They are active, interconnected, and multiple. This point is implicitly made in David Livingstone’s consideration of the porous boundaries of the landscapes of science. The impetus to move saltbush emerged from the results of 50 years of overconfident pastoralism combined with the unfamiliar pulse ecologies of inland Australia (Robin 2007). For this reason, we start this history in the western plains on New South Wales.

SALTBUSH IN WESTERN NEW SOUTH WALES

When British settlers first arrived in Australia in 1788 they saw a land full of potential riches, which they would realise by introducing cattle and sheep along with feed familiar to the

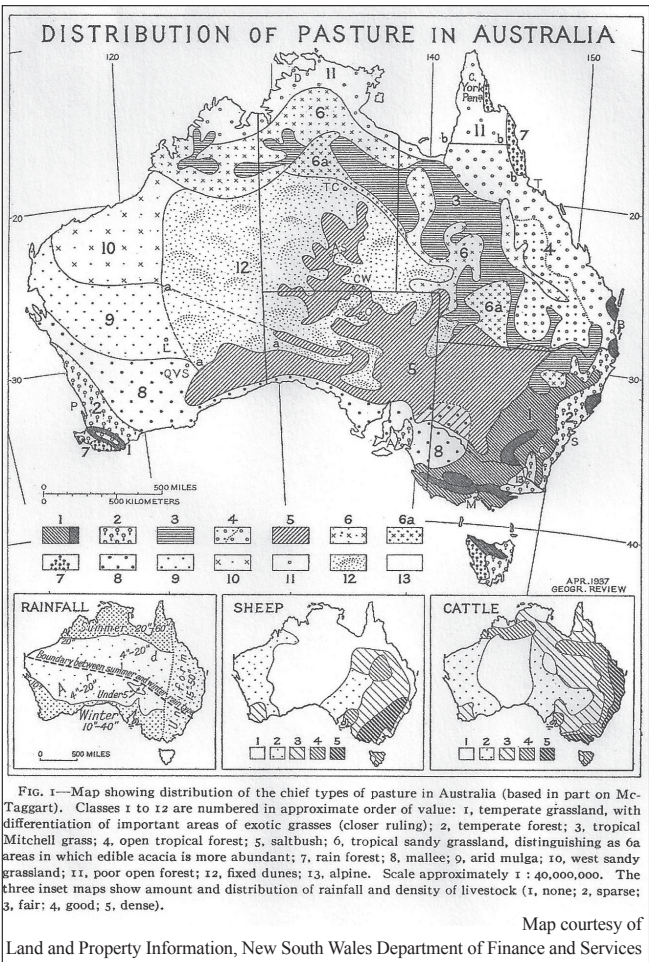


Figure 2

Geographer Griffith Taylor drew this map from data collected during fieldwork in Australia in 1907 (Taylor 1911, 1937)

animals. While some of the native grasses, cultivated within Aboriginal land management regimes (Gammage 2012) were expected to be useful, most were regarded with contempt as inferior to the fodder plants developed in Europe and used across the Empire. As squatters moved into the western regions of New South Wales, from the 1830s, they dreamed of a transformation managed by bringing new plants and animals to create recognisable places of production that would sustain life and livelihood in ways familiar to them. Over the early nineteenth century, newcomers to this region saw the saltbush as a symbol of the barrenness of the country, a *terra nullius*, that settlement would conquer—the measure of success was to be the disappearance of this native plant.

The major pressure on the saltbush country did not begin until 1861. At this time occupation began to move away from the main rivers because squatters could use new water conservation strategies like well digging and ground tank sinking, trialled earlier in the southern regions of the colony. The droughts of 1865 and 1869 hit hardest those who had not protected themselves with water reserves, so the lessons learned continued to appear to be about increasing the introduction of

water technologies. The advance into the saltbush country was then particularly accelerated during the 1870s because of high European wool prices and climatic optimism fostered by the further expansion of artificial water sources when the Great Artesian Basin was discovered with a successful bore near Bourke in 1878 (Goodall 2008).

Saltbush was treated with disinterest in the western districts of New South Wales over the two decades of the 1860s and the 1870s but there had been lasting effects. Firstly, with increased stocking rates and good seasons, there was the process of selective grazing on perennials like saltbush because stock actually found them palatable, thus depleting their prevalence during the early decades of this expansion. In his role as Chief Inspector of Stock, Alexander Bruce noted the eating out of saltbush on the intermediate as well as the more westerly 'saltbush' plains but regarded this as no loss to the capacity of the region to fatten sheep. Bruce published a map of New South Wales in 1871 that labels this region 'Saltbush Country' in recognition of the dominance of this vegetation type (Figure 3). The droughts in 1883–1884 and 1888 saw the impact of overgrazing escalated even further. In these dry

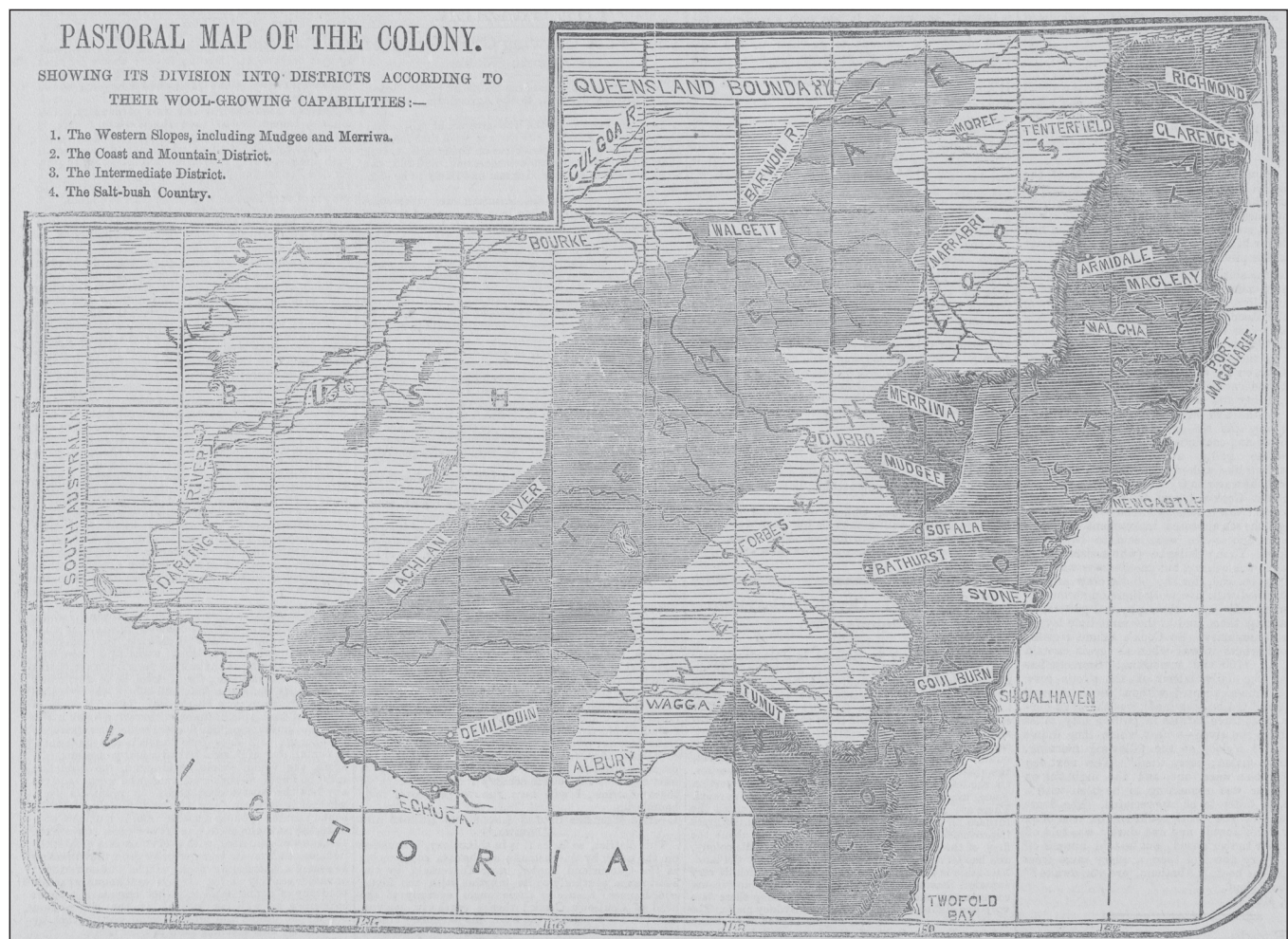


Figure 3
Alexander Bruce, Chief Inspector of Stock for New South Wales drew this map for the Wool Committee of the Agricultural Society (Town and Country Journal 1871)

years the ephemeral desert annuals failed to appear, leaving saltbush and just a few other shrubs as the only remaining fodder (Jeans 1972: 277). In their place, a mixture of pine scrub along with native spear, corkscrew, and wire-grasses, and a range of exotic burrs proliferated. None of these plants were palatable to sheep and cattle.

Financial stresses undermined wool prices from 1891, which then fell dramatically soon after in the world financial collapse in 1893. The peak of the westward advance of sheep was 1892, with 58% of New South Wales sheep then in the Intermediate district or saltbush country (Statistical Register of New South Wales 1892). Even more important for the carrying capacity of the western division was the expansion of the rabbits' territory from the mid-1880s, then the succession of severe drought years from 1898. With no markets and no fodder left sheep numbers rapidly declined in this western division as grazing businesses collapsed and passed into the hands of mortgagees. The faltering years of the 1880s and then the devastating collapse of the 1890s forced settlers in Australia to come to terms with the failure of their expected 'progress' across the landscape.

Over all of these changes, there had been voices raised pointing out how important saltbush was to the sheep industry. In evidence to the Royal Commission on Water Conservation in 1886, concerns were expressed about the saltbush country (New South Wales Parliament 1887). For example, M.H. Seale of Curranyalpa outside Forbes, who pointed to the new realisation that it was fodder that was the limit on grazing, not water: "we can always have enough water but no grass" (Jeans 1972: 288). Another voice who added to this debate was Fred Turner, who in 1890 was the botanist of the Department of Agriculture in New South Wales. He had experimented with indigenous grasses and forage plants in the Brisbane Botanic Garden and Queensland Acclimatisation Society in the 1870s and 1880s (see Turner 1895, 1899, 1921).¹ He argued for saltbush in the western division: "there is abundant proofs that when sheep are pastured in country where plenty of salinous plants are grown among the native grasses, fluke and other distoma diseases are almost unknown" (New South Wales Parliament 1901). These voices, even though rare, demonstrate that the environmental realities of drought and overstocking were generating a re-evaluation of management practices (see Quinn 1997 and Griffiths 2001).

Other voices went further in attempting to reshape attitudes towards the plant. As early as 1862, 'Combo' had written of this land as first class country for sheep stations. Saltbush country, he claimed, should be considered the best land in the colony—not the worst. The reasons he gave for these views, which were in contradiction to other widespread opinion, were threefold. First, the absence of diseases such as catarrh, Cumberland, bottle disease, and foot-rot in the drier parts of the colony reduced the loss of animals thereby increasing yield. Furthermore, he reiterated a claim circulating at this time that introducing sheep infected with fluke and catarrh to saltbush herbage had a medicinal effect curing them of the disease (Shepard 1871–1872: 264). Secondly, the drier and

warmer conditions meant that lambing and shearing could be done outside of the normal seasonal cycles. Sheep shorn in the winter in these areas would not suffer in the same way as colder climes, he argued. And finally, the dominance of saltbush rather than grass meant that wool did not attract grass-seeds that seriously devalued the quality of the wool. Having worked through the disadvantages of each of the major wool-producing regions of the colony he made a claim—which was then regarded as bold—that he had "endeavoured to show that in districts where there is no saltbush, there are now many drawbacks to the successful management of sheep and that, consequently only saltbush country can be considered first-class" (Combo 1862: 5).

As a result of the management practices implemented over the nineteenth century, pastures in the saltbush country had been devastated, never to recover fully. Yet those early voices about the interest shown by stock in eating saltbush had not gone completely unheard. The severe droughts from 1883 onwards brought the slow recognition that saltbush might be more than just a contemptible 'desperation' fodder, to be discarded once the desert had been forced back by the imagined lush grasses of 'civilisation'. At long last, saltbush was becoming something to value positively, a plant whose loss was to be regretted rather than celebrated. The recognition of this loss was bound up in the acknowledgement of the destructive consequences of pastoralism to the environment. In addition, new ideas about the usefulness of saltbush started to take hold in the Australian colonies.

AUSTRALIAN SCIENCE FOR SALTBUSH CONSERVATION

While the approach of people trying to settle the western division represents one set of responses to saltbush, another group of Australians were formulating a different reaction to the environmental conditions that were plaguing settlers. Botanists, primarily located in the urban centres of Sydney and Melbourne, were actively engaged in the process of identifying and classifying indigenous plants to contribute to the global project seeking to order the botany of lands unknown to Europeans. The specimens collected by early explorers and travellers in these areas added to the knowledge about Australia as a 'new' place. Early exploration required this material to be returned to British centres for classification. However, by the mid-nineteenth century much of this scientific work was undertaken in the botanic gardens of Sydney, Melbourne, Adelaide, and Brisbane. Colonial botanic gardens had a range of functions that were similar in the different outposts of the British Empire. In Australia, botanists gathered information about the uses of plants at the same time that they prepared specimens and analysed systematic information.

These botanists and their botanic gardens operated in direct response to the environmental conditions of a specific colony. Joseph Maiden, who was director of the Sydney Botanic Gardens from 1896 to 1924, pointed this out when he stated, "We in New South Wales have to work out our own problems,

some of them the result of our special environment and hence the experience of other countries can only help us as a guide and we cannot slavishly follow models, however excellent” (Maiden Undated: 20). They were pressed into action on behalf of powerful groups in any given settler society. In this case, where western lands were seen to be failing to support pastoralism, this was a ‘problem’ of the particular environmental conditions of one part of New South Wales. Botanists worked to produce knowledge about saltbush and other botany from those regions that would help settlers to settle.

The specific value of saltbush was that while it *could* thrive in optimal conditions, unlike other plants, it behaved very differently in dry periods. When other grasses and botany succumbed to dry conditions, lack of water, and eventually drought, saltbush went on growing. The major contribution of saltbush was that it would act as a reserve fodder for consumption by sheep and cattle during droughts. This meant that although of medium or minimal value in good times, in times of scarcity, it became vitally important to settler economies. By the 1890s, settlers in Australia had been forced to face the fact that they could not avoid or control severe droughts. Instead, they would have to look to what they had previously despised in the native environments and identify new value there. Saltbush fitted this scenario—once drought was recognised as requiring different and new methods, saltbush too could be recognised as a useful, if by now threatened, plant.

From his base at the Melbourne Botanic Gardens and then the National Herbarium of Victoria, Ferdinand von Mueller generated publications such as the 1876 *Select Plants, readily eligible for industrial culture or naturalisation, with indications of their native countries and some of their uses*. Mueller lists two species of *Atriplex* in his first edition in 1876—*A. nummularia*, and *A. spongiosum* (Mueller 1876: 26). In 1881 under the different title of *Select Extra Tropical Plants* he lists a further five species: *A. crystallinum*, *A. halimodes*, *A. hortensis*, *A. semibaccata*, and *A. vesicarium* (Mueller 1881: 39–41). These additions represent an expansion of knowledge that was linked to the plants’ value to pastoralism. Most species of saltbush were identified for their relative value as a fattening agent in sheep and cattle pasturage. *A. halmoides* was “among the very best for saltbush pasture” while *A. nummularia* was “one of the tallest and most fattening and wholesome of the Australian pastoral salt-bushes”. *A. semibaccata* described as “a perennial herb, very much liked by sheep” and *A. vesicarium* was “perhaps the most fattening and most relished of all the dwarf pastoral salt-bushes of Australia” (Mueller 1881: 39–41).

Following the success of his 1876 work *Select Plants*, Mueller went on to produce illustrated works for Eucalyptus, Acacia, and Myoporinous plants. These works were produced with detailed illustrations that conformed to scientific standards but were distributed to a general audience to assist in the correct identification of different species in pastoral environments. In 1889, as the anxiety about settling the country through times of drought peaked, Mueller published the ‘next sequence’ in this series about Australian plants. “It was deemed best” he wrote

in the preface, “to select the Salsolaceae... inasmuch as this ordinal group in the vegetation of Australia presents not only a multitude of endemic forms of high phytologic interest but also a considerable number of prominent utilitarian value” (Mueller 1889). Included in this group were detailed examinations of the varieties of the *Atriplex* species. The *Agricultural Gazette of New South Wales* also published articles about saltbush in their early editions through the 1890s. Up to 4,000 copies of this journal were distributed in monthly issues throughout New South Wales. Viewed as a body of work about saltbush, such publications all aimed to facilitate a change in attitude to the plant by demonstrating its value as fodder for sheep and cattle.

The Australian loss of saltbush generated the aspiration among the colonial scientific community and other advocates to ‘protect’ the plant lost through the experience of drought, overstocking, and rise of pest animals and plants. Through this work they clung to the possibilities of providing steady and stable activities and livelihood in these marginal areas. Joseph Maiden wrote of saltbush:

Unless stock-masters can see their way clear to keep their sheep &c., in certain paddocks, while the vegetation in others is endeavouring to recuperate, this kind of vegetation will continue to diminish, to the detriment of the pastoral industry. Greedy cropping of salt-bush without any efforts at conservation is assuredly “killing the goose with the golden eggs” (Maiden 1889: 117).

Botanists lent weight to the emergence of the idea that the saltbush, if protected, saved, and nurtured, would establish an ecological regime that would turn the fate of pastoralists around and enable secure forms of settlement. Out of the crisis of environmental disaster came the desire to actively stimulate environmental change so that the balance would shift back in favour of human settlement.

The scientific work and advocacy found in scientific circles was not undertaken in isolation by the existing urban based colonial experts in acclimatisation, such as Mueller and Maiden. Instead this knowledge was combined with experimental work instigated by the newly formed New South Wales Department of Agriculture in 1890. One of the earliest aims of this department was to provide education and research that would support settlement in Australia. The first experimental farms were located close to Sydney, at Hawkesbury, and quickly followed along the Richmond River in northern New South Wales. Experimentation on plants that were particularly adapted to dry regions tended to fail in the humidity of these coastal locations. This saw the establishment of experimental farms in places where trialling could be conducted in climatic and geographic regions that were feeling the effects of drought and overstocking.

The New South Wales Department of Agriculture established experimental farms and stations in the following places across New South Wales between 1890 and 1920s: Arrawatta, Bathurst, Beelbanger, Berry, Coolabah, Condobolin, Coonamble, Cowra, Glenfield, Glenn Innes, Grafton, Griffith,

Hawkesbury, Nyngan, Temora, Trangie, Wagga, Wollongbar, and Yanco (New South Wales Department of Agriculture Undated). Experimental farms were distributed across the state and this enabled the department to respond to the specific needs of agriculture in their area. They supported industries and tested crops, producing data that accounted for region-specific soil, vegetation, and climatic variations. The farms at Wagga and Coolabah, whose research work dealt mainly with wheat and orchards, conducted systematic experiments with saltbush (Sutton and Kelly 1908: 49). Coolabah was located south of Bourke on 1500 acres of land typical of the western division.

Robert Peacock was appointed the manager of the Coolabah station in 1898. He worked alongside William Farrar who was experimenting with different varieties of wheat in the hope that one could be found that would thrive in the dry conditions of the western division. It was Peacock who initiated a campaign for the restoration of native plants, experimenting with saltbush in particular, whilst working at the station (Muir 2011). The purpose of these experiments was to ascertain information about cultivating saltbush and to “determine the carrying capacity of land”. This meant observing the different ways the seeds germinated, trialling different sowing techniques, optimising crop density through spacing of individual plants, and monitoring water requirements (Peacock 1911). He monitored the quality of the wool and observed the stamina of the sheep after prolonged periods eating the saltbush. Peacock produced and reported information about how to introduce, manage, and cultivate saltbush.²

There were two important findings in these experiments. The first recommendation was that saltbush could be managed by keeping paddocks specifically for saltbush growth, which could then be used in times of need as seasons dried out. This was a relatively low input method of protecting the saltbush. All that was required was to fence off sections of the land and restrict use until times of need. Secondly, these experiments found that for this to become viable, pasture improvement for pastoralism, and consistent methods of planting needed to be established. Saltbush required a high level of input in the early stages of its establishment. In this way, like lucerne, a ‘crop’ of saltbush was ‘produced’ for the consumption of domesticated animals. This meant a commitment by pastoralists to the process of growing fodder crops that appeared to be environmentally appropriate for these particular arid and semi-arid places.

INTERCOLONIAL WORLDS AND SALTBUSH MOBILITY

The experimental stations of the Department of Agriculture in New South Wales were not the first to trial saltbush in arid conditions. By 1881, saltbush seeds, plants, and cultivation knowledge were being circulated to California, South Africa, and India. Cycling material out of Australia to other regions was an integral part of the work of nineteenth century botanists. Saltbush became an obvious contender for this type of

exchange, and Mueller targeted places where arid and semi-arid farming was being attempted. Of this Mueller wrote:

But, irrespective of our own motives for practical gain, we here should remain conscious, that while we are constantly adding from abroad to the plant-treasures of Australia, we likewise in a cosmopolitan spirit should afford facilities in return, to select from the Australian gifts of nature whatever might be conducive for increasing also the riches of rural pursuits in any other part of the world, with a genuine and disinterested desire for adding this from here to the comfort and prosperity also in many another land through circumspect benignity and due gratefulness of ours (Mueller 1889: 1).

Within this spirit of cosmopolitanism, Mueller sent saltbush seeds and plant material to Royal Botanic Gardens, Kew; Mr J.F. Duthie of the Saharanpur Botanic Gardens, India; the Director of Agriculture and Commerce of the North-Western Provinces and Oudh, India; Professor MacOwan, Agricultural Department, Cape Colony, and Dr H. Behr of the University of California Agricultural Experiment Station, USA (Royal Gardens Kew 1896). Such was the shared enthusiasm for disseminating plant material and botanical knowledges from other places that each of these recipients moved saltbush into the compatible regions within their own colonial boundaries. For instance, Duthie sent seeds and plants to Lucknow, Cawnpore, and Kurnaul for testing (Watt 1891: 349–351). This was not a matter of ad hoc acclimatisation of plants for curiosity sake but marrying the adapted plant products of one dry region to others across intercolonial networks (Beinart 2003: 314).

Importantly, the experiments undertaken in each of these regional centres, by botanic gardens, government agriculture departments, the experimental stations of universities, and colonial governments were recorded and documented in a range of different types of reports. Like the saltbush plants and plant material that had been circulated, these reports travelled through the same sorts of networks, returning to Australian scientists. In this way, key figures and institutions engaged in experimentation with saltbush in Australia received information about experiments conducted on other continents. For example, the Sydney Botanic Gardens received reportage from all of these countries as part of its specialist library collection used by the professional scientific staff of the day. This became comparative data about the potential adaptability of saltbush for dry land farming.

Distribution of the results of the Californian experiments, in particular, became important in the way that the plant was taken up within the Australian circuits of pasture improvement. Ian Tyrrell has explored a small selection of the exchanges between Australia and California emphasising the similar Mediterranean geographies that exist in these two places (Tyrrell 1999). As Philip Pauly (1996: 55) points out this work was not systematically approached at a national scale but instead was piecemeal and opportunistic. These opportunities arose through comparative experiences at a regional scale; from

one area attempting dryland farming to another. Californian experiments also linked up with Arizona that had more marginal types of farming land. The corresponding relations between Mueller and his counterparts facilitated the movement of plants that depended on the regional similarities of these environments and the common problems that were faced in developing agricultural enterprises.³

In California, seeds were first received from the National Herbarium of Victoria in 1881 and continued to arrive every year until Mueller's death in 1896. Later Joseph Maiden sent seeds from the Sydney Botanic Gardens (Maiden 1900: 11) and Robert Peacock from the Coolabah Experimental Station (Muir 2011: 126) to continue this trade. The station in California distributed 5,000 pounds of saltbush seed in small trial packages to proximate farmers from the Tulare sub-station. Distribution through the San Joaquin Valley was additionally assisted by promotion in local newspapers. Scientists located at this station found that *A. semibaccata* compared favourably to alfalfa as a fodder crop in terms of its digestible nutrients. When it was distributed to farmers, the results were mixed regarding the palatability to sheep and cattle. Regardless, it was this species above others that was widely distributed by the station and was eventually taken up by the seed industry in that country (Shinn 1899). Success in American dry land farming became an important beacon for the Australian context.

The experiments in California were used as important evidence in the advocacy for a more systematic approach to saltbush cultivation in Australia. The *Garden and Field*, a weekly newspaper circular from South Australia led their article about the value of saltbush with a summary of the bulletin information provided through 18 years of experiments at the Californian experiment station. It is curious to think that the Australian readers of the *Garden and Field* (1901) needed to know that Californians had found that "It is an arid plant and can not endure heavy rains or a moist warm climate". Mr A.N. Gatenby went as far as to recommend that "Australians write to Americans about our native saltbush" (Agricultural Gazette of New South Wales 1905). The details of the experiments were less important than the manner in which an Australian plant was being valued in America.

Similarly Fred Turner's *Australian Grasses and Pasture Plants* published as part of the Australian Practical Handbooks series argued that *A. semibaccata* was revered in California as "most valuable feed for sheep, which thrive and fatten on it" (Turner 1921: 58–59).⁴ Turner used the data from California to support his call for saltbush to be used in Australian pasture management regimes. The experiments in California are juxtaposed with knowledge in Turner's championing of this particular saltbush. The acceptance by American farmers and scientists added to the credibility as a useful plant for Australian conditions.⁵ A new way of thinking about saltbush emerges from this advocacy. Robert Peacock exemplifies this when he wrote for the *Agricultural Gazette of New South Wales*. "During droughts the sterling qualities (of saltbush) are very much in evidence and a capacity for holding to carry its stock through

such seasons is largely dependent upon the quantity of saltbush of which it can boast" (Peacock 1896: 791).

Amongst this mix of scientific advocacy and state sponsored experiments the saltbush also became the subject of commercialisation by the seeds and nursery businesses of Sydney. By the close of the nineteenth century, three companies were selling seed of saltbush as agricultural produce for pasture improvement. These were Anderson's & Co. 1884–1889, Arthur Yates & Co. 1898–1905 and PLC Shepards 1889–1899. Each of these companies were mixed businesses that also dealt in the ornamental and nursery market alongside their provision of seeds for pastoral and agricultural purposes. These businesses used catalogue systems to reach extra-urban communities. This was a technique that was important in supplying the widely and sparsely distributed farming communities of Australia. Anderson's & Co. printed 30,000 annual catalogues for distribution upon request to meet market demand. Saltbush first appears as a commercial prospect in the 1897 catalogue of Anderson's & Co. and was included in a variety of catalogues in the early twentieth century.⁶

Commercialisation of saltbush seed reduced the number of different plants that came to be known under this description. This catalogue points out that 112 species of saltbush grew in Australia. Saltbush initially referred to a whole suite of plants and not just the ones of the genus *Atriplex*. In a 1911 Farmers' Handbook published by the New South Wales Department of Agriculture, *Rhogodias*, *Chenopodium*, *Enchylornas*, and *Kochias* are all listed as saltbush. Only three of these appear in the Anderson's & Co. catalogue—old man saltbush *Atriplex nummularia*, half berried saltbush *Atriplex semibaccata*, and halimus-like saltbush *Atriplex halimiodes* (Clarke 1911). The catalogue goes on to lament the scarcity of seed available for them to sell. Californians reported that securing saltbush seed was hampered by the expense of gathering and cleaning in Australia (Shinn 1899: 15). By the late 1890s seedsmen had secured the collection of seed from what they called 'native habitats'. The biology of these three plants greatly assisted the seedsmen here. They were sold in batches at 5 shillings for each pound of 20,000 seeds. Each of these species were prolific producers of seed. This was a biological feature that had helped to secure survival in dry conditions making them a perfect fit for enrolment in commercial activity.

Some Australian pastoralists did take up the saltbush as a fodder plant following the recommendation by Peacock to set aside paddocks for the growth of the plant. These came to be called 'drought paddocks' (The Australian Field 1897: 227). Frank Fisher of Boorooban reported to the Hay Land Board in 1905, that he had successfully grown four acres of saltbush on his land for this purpose from 1902 (Sydney Morning Herald 1905a: 14–15). P.J. Holdsworth the Parkes district, Mr Williams of Molong and Mr A.F.W. Stewart, who identified himself simply as a 'western man', all responded to the new understanding of the once despised plant by planting and nurturing saltbush (Sydney Morning Herald 1903, 1909, 1910). In the Brewarrina district, William Dickson of Yarrowin Station, continuously planted saltbush from 1884, saying, "we

have taken considerable pains to conserve the saltbush and edible scrub". E.S. Antill of Marra Station transplanted saltbush in 1900 and was "sure it would pay to restore the edible scrub." W. Sawers of Bundabulla Station used the "system of small paddocks" allowing them to become "dense with saltbush" under rotation methods. While in the Wilcannia district E. Quin of Tarella Station thought that it was "practicable to grow saltbush in a garden using a watering pot". G. Riddoch of Weinteriga Station, experimented with fencing areas for saltbush without any success. At the same time at Nyngan T.E. Grigg had been successful "in a marked degree at sowing saltbush seed after rain" and watched the country materially improve. (New South Wales Parliament 1901) These self-interested pastoralists conserved saltbush as a fodder plant.

THE FIGURATIVE SALTBUSH

The emergence of the term 'saltbush' as a colloquial symbol in Australian popular culture reflects the same shifts that we have described in this paper across the commercial and the scientific arena. The poem 'Saltbush Bill' was published by A.B. 'Banjo' Paterson in the early 1890s, based on the fame of a Australian entertainer by the same name, an expert in bush skills (Roberts 1998). The term's early meaning is shown by the way the real Saltbush Bill acquired his nickname as a teenager in 1883. It had referred to the way the young stockman was never to be found when the boss wanted him because he had always ridden a long way off, 'out in the saltbush'. There are similar terms still in use today, like 'off in the mulga' or 'off in the scrub', suggesting a metaphoric placement not only at a great distance but in wasteland, far away from civilisation and society. So 'saltbush' in 1883 still meant useless land.

Just a decade later, the real Saltbush Bill began exhibiting his showmanship on the Australian, European, and United States exhibition circuits with thrilling demonstrations of whip craft and other 'Australian' bush skills. This was also the time of the worst drought and depression that settlers had ever known in rural Australia. 'Banjo' Paterson was from a pastoralist family who had made a substantial living out of their Australian land holdings but in his poetry from 1885 "Paterson wrote for all who were battling in the face of flood, drought and disaster" (Semmler 1988: 1541–1557). In his 1893 poem, Saltbush Bill, the *idea* of 'saltbush' had acquired a very new meaning.

The poem's 'Saltbush Bill' was "a drover tough as ever the country knew" who was trying to save his starving sheep because his own property had been devastated by drought (Paterson 1895).⁷ To survive, he was droving his sheep on the 'long paddock'—the half mile wide public stock routes along all the country roads, which were intended to provide fodder for stock as they were brought down to market. But Saltbush Bill was just droving them endlessly "a mob that could scarcely creep", trying to keep them alive till it rained again, and spreading them out to feed onto the richer graziers' (known as 'squatters') private land when he could get away with it. At one likely spot, he tried to spread the stock out for a bit of

feed but they were seen by a 'Jackaroo'—a privileged young English 'new chum' who was working for the squatter—who with the help of the squatter's stock hands tried to drive the drover's sheep back with whips and dogs till they would have only the dry grass along the roadside to eat.

Not to be defeated, Saltbush Bill taunted the Jackaroo till he was goaded to fight for his honour. The Jackaroo agreed, so—as the sheep ran loose on the squatters land—the drover and the 'new chum' "battled it out in the regular prize-ring style". Paterson gives a humorous account of the fight, with the drover dancing around and prolonging the battle until nightfall. When Saltbush Bill finally pretended to be defeated, the Jackaroo rode proudly back to the homestead:

... and told them a story grand
Of the desperate fight that he fought that day with the King
of the Overland.
And the tale went home to the Public Schools of the pluck
of the English swell.

But Saltbush Bill, while the fight dragged on, had let his sheep fan out on the squatter's land and it took a week for the squatter's men to round them all up and force them out. As Paterson concluded his poem, the squatter's men were rounding up the sheep:

With a week's good grass in their wretched hides, with a
curse and a stock whip crack,
They hunted them off on the road once more to starve on
the half-mile track.
And Saltbush Bill, on the Overland, will many a time recite
How the best day's work that he ever did was the day that
he lost that fight.

Saltbush had indeed taken on a very different meaning with this story. Still 'tough' and struggling with drought, this narrative opposes a smart and wily colonial upstart against an arrogant metropolitan, who assumes he has won when he has in fact been duped and defeated. The implied shift in national characteristics as well as 'native' flora is illustrated clearly in this parable.

Paterson's many 1890s poems celebrated the same newly crafted 'Australian' character, shaped by bitter defeats against the continent's unpredictable environment, anti-metropolitan, often with sarcastic, self-deprecating humour, and with the capacity to survive and triumph because of those harsh environmental lessons. This particular construction of national character, which certainly recognised bitter defeats and climatic disasters, but predicted tough, sardonic survival, was essentially hopeful. It offered a way to envisage the future that attempted to turn adversity and failure into the success of a kind, even if it was the bitterness of the 'poor man's orange', an astringent variety of orange that was sour and cheap but nourishing.

Such a characterisation of the 'Australian' identity offered some comfort during the bleak days of the deaths at Gallipoli in 1915, suggesting the perverse logic that

led to the elevation of a defeat and retreat (blamed on the British) into a celebration of 'the nation'. Paterson's volume, *Saltbush Bill JP and other Verses* was published in 1917, endorsing the imagery of a uniquely Australian character, using the botanical symbol to indicate the bitterness arising from drought and defeat but suggest a tough, wily resilience nevertheless. It was an attractive imagery for a masculinist, anti-British nationalism, and this version of Australian identity, anchored in visions of a hopeful future despite being shaped by defeat and a bitter environment, persisted long into the twentieth century.

CONCLUSION

In the nineteenth and early twentieth centuries conserving saltbush was tied to its utilitarian value. Suffice to say that responding to the environmental crisis did not mean that settlers believed that it should be returned to some sort of pre-European state where the health of the environment might have been measured by its intrinsic value. Nor does it mean that this type of conservation was taken up as a universal means of managing the arid and semi-arid pastoral lands of western New South Wales. Instead, we have shown that in some places new values were applied to indigenous botany—in this case it was conserving a native plant that retained a central focus on potential economic outcomes. The seeds of change in attitude were found in the scientific circles of colonial society. Making a place for botanical science went hand-in-hand with the quest to instigate environmental change for the best possible economic outcomes.

Enrolling saltbush into management practices depended upon lacing the results of experiments with the hope that such a change in attitude would mean a new kind of security in marginal lands. This process was not restricted to scientific or economic arenas either. Saltbush also made its way into the cultural vernacular, emerging as a companion species to the new Australian masculinity of Federation literature. The poetry of AB Paterson reiterated the despair and hope that were found in other ways of understanding and thinking about the plant. The moves to transform attitudes to saltbush and conserve it are littered with hopeful statements and they ring through all of the literature about it; carrying with them the desire to push back the desert for white settlement.

Hope acts as connective tissue binding the conservation of saltbush to experiments for environmental change. It was this same hope that mobilised saltbush away from Australia to India, California, and South Africa—each with its own regimes of sheep and cattle needing secure fodder in semi-arid and arid conditions. In all of these places saltbush was promoted as a useful plant that would provide an insurance against drought, enhancing the possible types of economic activity that could be attempted in such geographies. Hope was not a wistful, dream-like emotion but instead was a mobilising agent, helping settlers to make saltbush move, from the western plains, to the laboratories and experimental stations in Australia, India, California, and South Africa, and then into the hands of the

commercial seedsmen. When it eventually returned to pastoral stations in the western plains it completed a circuit in a network that transformed saltbush into a plant worthy of conservation.

Notes

1. See also this series of pamphlets: Turner, F. *New commercial crops for New South Wales*. Sydney: Charles Potter; Turner, F. *Noxious introduced weeds of New South Wales*. Sydney: Charles Potter; Turner, F. *Supposed poisonous plants of New South Wales*. Sydney: Charles Potter; Turner, F. *Suspected poisonous plants of New South Wales*. Sydney: Charles Potter; Turner, F. *West Australian grasses*. Sydney: Charles Potter; Turner, F. *West Australian salsolaceous plants*. Sydney: Charles Potter; Turner, F. *An ecological study of one hundred species of Queensland grasses*. Sydney: Charles Potter; Turner, F. *Indigenous forage plants of Australia (non-grasses)*. Sydney: Charles Potter; and Turner, F. *The grasses of New South Wales*. Sydney: Charles Potter.
2. Libby Robin points out that saltbush experiments were a central concern of the early twentieth century scientists too. T.G.B. Osborn of University of Adelaide commenced experiments at Koonamore Station in South Australia in 1925. The original quadrants are still monitored and provide photographic evidence of change over a period of 85 years.
3. Geographer Griffith Taylor was to scrutinise these assumptions in his later writings—comparing the geological formations and the possibilities of irrigation in Australia and United States. He concluded that the two areas were only superficially similar and would never be populated by the same numbers of people (Taylor 1911, 1937a, 1937b).
4. This 1921 publication reiterates Turner's work from the 1890s.
5. Other works by Turner included regular publication in the *Agricultural Gazette* of New South Wales, in addition to monographs about Australian grasses.
6. Anderson's & Co. catalogue of seeds and plants. 1884-1889. Sydney: Andersons & Co.; Anderson's & Co. catalogue of seeds and plants. 1897. Sydney: Anderson & Co.; Arthur Yates and Co. catalogue of seeds and plants. 1898-1905. Sydney: Arthur Yates and Co.; PLC Shepard catalogue of seeds and plants. 1889-1899. Sydney: PLC Shepard; and Francis Ferguson's catalogue of seeds and plants. 1880. Sydney: Francis Ferguson.
7. This poem was first written c. 1893 and appeared in Paterson's first collected volume *The Man From Snowy River*, published in 1895, by Angus and Robertson, Sydney.

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